ABSTRACT

The present invention relates to a method of inhibiting graft-versus-host disease in allogeneic hematopoietic stem cell transplant (HSCT) patients by using L-leucyl-L-leucine methyl ester (LLME) to eliminate selective cytotoxic T cells in donor lymphocyte infusions (DLI). LLME has been shown to inhibit GVHD in animal models by selectively inducing apoptosis in natural killer cells and cytotoxic T cells. The application of LLME to the human clinical HSCT situation, however, has been hampered by HSC toxicity when unseparated marrow is treated at the concentrations necessary to purge GVHD-inducing T cells prior to infusion. In the present invention, this problem is circumvented by the LLME *ex vivo* treatment of DLI administered following transplantation of T cell-depleted HSC. In this setting, the effects of LLME on HSC contained within the DLI are irrelevant for clinical outcome. In another embodiment, the risk of toxicity to the stem cell population is avoided by *ex vivo* LLME treatment of donor lymphocytes after separation of $CD34^+$ stem cells and then co-administration of the LLME-treated donor $CD34^-$ fraction and the untreated $CD34^+$ stem cells.